

10. (original) The article of claim 1 in which the transition layer is deposited by a PVD process.

11. (currently amended) The article of claim 8 1 in which the metal bearing color layer is deposited by a PVD process.

12. (original) The article of claim 1 in which the transition between the first composition and the second composition of the transition layer is smooth.

13. (original) The article of claim 1 in which the transition between the first composition and the second composition of the transition layer is in discrete steps.

14. (currently amended) The article of claim 1 in which ~~a first purpose of the transition layer is to be essentially transparent and colorless to visible light and a second purpose~~ the first composition of the transition layer ~~is to provide~~ provides corrosion resistance.

15. (currently amended) An article of manufacture having on at least a portion of its surface a thin transition layer consisting of a metal bearing material having a composition that varies from a first exterior composition to a second composition beneath the exterior composition and in which the first composition provides ~~has, at least in part, the function of~~ corrosion protection, and ~~in which~~ the second composition determines the visible color of that portion of the article surface to which the transition layer is ~~applied~~ applied.

16. (original) The article of claim 15 in which the transition layer is superimposed on a metal bearing color layer and the second composition of the transition layer is essentially transparent.

17. (original) The article of claim 15 in which the visible color of that portion of the article surface to which the transition layer is applied is determined by the second composition.

18. (new) The article of claim 1 wherein the transition layer has a thickness of about 150 Å or less.

REMARKS

The Office Action objects to claims 8 and 15 not for any reason relating to patentability, but for a misspelling of the word “applied” in claim 15. The above amendment corrects the

spelling of the word "applied." The Office Action does not specify a reason for the objection to claim 8 other than the misspelling in claim 15, and review of claim 8 reveals no misspelling.

Applicant has canceled claim 2 and modified the dependencies of claims 3, 7-9, and 11 to reflect this cancellation. Applicant has amended claim 1 to specify that the transition layer is substantially transparent and colorless to visible light. Claim 1 has also been amended to include the metal bearing color layer previously included in canceled claim 2. Claim 14 has been amended to cancel the limitation relating to the transparency in view of the amendment to claim 1. Claim 15 also has been amended for clarification. Claim 18 has been added to further define the present invention.

Claims 1-17 stand rejected under 35 U.S.C. § 102(b) under one or more of several references.

1. Claims 1-4, 6-12, 15 and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 4,919,773 to Naik.

The '773 patent discloses a boride, carbide, nitride, or oxide exterior layer applied onto a pure metal in which the boride, carbide, nitride, or oxide layer has a thickness between about 0.2 mils (50,800 angstroms) and about 1.5 mils (381,000 angstroms). Column 6, lines 47-48. This layer can be graded such that the concentration of the boride, carbide, nitride, or oxide is greatest toward the top surface of the layer and decreasing toward the bonding surface between this layer and the metallic layer underneath. Column 6, lines 58-67.

The '773 patent teaches away from the claims of the present application, as amended, because the thickness of the layers in the '773 patent are so great that they cannot be substantially transparent as claimed in claim 1 of the present application. As discussed on page 10, lines 5-15 of the present application, thicknesses greater than about 150 angstroms are generally not transparent. Thus, the thicknesses described in the '773 patent make it impossible for the exterior layer to be substantially transparent, as claimed in claim 1 of the present application.

Thus, the '773 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Naik '773.

2. Claims 1-2, 4-5, 9-10, 12-13, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 4,403,014 to Bergmann.

The cited portion of the '014 patent with regard to color selection does not teach a layer that varies from a first exterior composition to a second composition beneath the exterior first composition, as claimed in the present application, as amended. The '014 patent teaches mixing carbide, nitride, or boride with gold in equal percentage by volume of mixture and gold. Column 3 line 57 through Column 4 line 16. This is a single deposition layer and not a graded transition layer.

The exterior portion of the layer in the '014 patent provides the color to the article. It is the "free coating surface" that provides the color. Column 9 lines 1-4. In the claims of the present application, as amended, the transition layer is superimposed on a metal bearing color layer and the first composition is substantially transparent and colorless to visible light. The color of an article coated in accordance with claim 1 of the present application is determined by the metal bearing color layer. Unlike the layer in the '014 patent, the exterior composition does not provide the color to the article in the claims of the present application.

The '014 patent teaches away from the claims of the present application, as amended, because the thickness of the layers in the '014 patent are so great that they could not function as claimed in the claimed invention. The layers in the coating described in the portion referenced in the Office Action have thicknesses of 0.1 micrometer, 0.5 micrometer, and 1.5 micrometer, for a total layer thickness of 2.1 micrometers or 21,000 angstroms. See, for example, Column 9, lines 18-25. As discussed on page 10, lines 5-15 of the present application, these thicknesses make it impossible for the layer to be substantially transparent, as claimed in claim 1 of the present application.

Thus, the '014 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Bergmann '014.

3. Claims 1-2, 4-5, 7-8, 10-12, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by UK patent application GB2284431A to Wang.

The coating in the referenced part of the Wang application is a three-layer coating. The intermediate of these three layers is a gradually changing alternate layer with four different phases.

The transition layer of the present invention is a single layer having a composition that varies from a first composition to a second composition. One portion of the claimed transition layer is the exterior portion of the layer. The claimed transition layer is not a layer with four kinds of phases as described and claimed in the '431 application.

Moreover, the Wang application does not teach that a transition layer is substantially transparent and that the transition layer is superimposed on a metal bearing color layer, as claimed in the amended present application. On the contrary, the Wang application teaches that it is the pure metal, gold, that provides the color. See, for example, page 1, lines 19-21; page 8 lines 9-11 of the Wang application.

Thus, the Wang application does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on the Wang application.

4. Claims 1-5, 7-12, and 14-17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 5,037,517 to Randhawa.

The '517 patent teaches a transparent layer underneath the gold exterior layer on the article. The transparent layer of the present invention includes the exterior metal or metal-based composition and is not placed underneath a metal exterior layer. The '517 patent teaches that the transparent layer must have a thickness less than 100 angstroms to be transparent, but does not identify that the exterior layer has this thickness. The '517 patent does not teach that the exterior layer is substantially transparent, as claimed in the present amended application.

Also, the example cited in the Office Action in Table I was a failed example—the structure failed within 48 hours. Column 6 lines 27-29. Thus, this patent teaches away from the successful use of gold-coated parts having a graded interface with ZrCN.

The '517 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Randhawa '517.

5. Claims 1, 2, 4, 6, 10, 12, and 14-17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by EP patent application EP 0430874A1 to Schulz.

The Office Action asserts that the Schulz application teaches a graded/transitioned layer (8) from a hard layer of TiN to an isolating layer (9) of alumina. The Office Action asserts that internal thin alumina layers are essentially transparent. The Office Action further asserts that this reference teaches the isolating layer passing into a transition layer (11) into aluminum.

As claimed in the present application, as amended, the transition layer, which includes an exterior composition, is substantially transparent. The Schulz reference does not disclose a coating with an exterior layer being substantially transparent. The interior alumina layer disclosed in the Schulz reference is not a layer having a composition that varies from an exterior first composition comprising a metal to a second composition beneath the exterior first composition, as claimed in the present application, as amended. Also, there is no disclosure of a metal bearing color layer on which a transition layer is superimposed, as claimed in the present application.

The Schulz reference does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Schulz reference.

6. Claims 1, 2, 4, 5, 7-12, 14-15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 4,415,421 to Sasanuma.

The color of the article in the '421 patent is caused by the outer layer of gold. See, e.g., Column 4 lines 53-56. There is no metal bearing color layer upon which a transition layer is superimposed, as claimed in the present application, as amended.

The '421 patent teaches that the thickness of the exterior metal (gold) coating varies between 0.1 microns (1000 angstroms) and 2 microns (20,000 angstroms). See Column 4, lines 4-6; Table 2. As discussed on page 10, lines 5-15 of the present application, such thicknesses are too great to be transparent. The present application, as amended, claims that the transition layer, which includes an exterior first composition, is substantially transparent. The exterior layer of the '421 patent is not transparent, because the thicknesses of the exterior layer are almost ten times, at best, too thick to be transparent.

The '421 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Sasanuma '421.

7. Claims 1, 4, 6, 10, 12, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 4,973,388 to Francois et al.

The color of the article in the '388 patent is given by electroplating a final coating of gold onto the previously deposited layers having nitride. Column 5 lines 6-10. The thickness of this final gold coating is between 0.1 micron (1000 angstroms) and 30 microns (300,000 angstroms), which is much too thick to be transparent, as claimed in the present application. There is no transparent layer here.

Moreover, there is no metal bearing color layer onto which a transition layer is superimposed, as claimed in the present application. The color layer in the '388 patent is the final gold layer that is electroplated as the final surface layer. See, e.g., Column 3, lines 35-41, 56-59. Color variations are possible by varying the electroplating conditions for that exterior surface layer. See, e.g., Column 3, lines 56-59.

The '388 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Francois et al. '388.

8. Claims 1, 2, 6, 7, 10, 12, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by Japanese publication 06-073530 to Katsuhiko.

Similarly to the above discussions, the Katsuhiko reference does not disclose that the exterior layer is transparent and does not disclose a metal bearing color layer onto which the transition layer is superimposed, as claimed in the present application. The thicknesses of the aluminum layer, which is identified in paragraph 8 as the third, exterior layer, is between 2.0 micrometers (20,000 angstroms) and 6.0 micrometers (60,000 angstroms). See paragraph 38, Table 1. As discussed above, such thicknesses are too thick to be considered transparent.

The Katsuhiko reference does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on the Katsuhiko reference.

9. Claims 1, 2, 6, 7, 10, 13, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by UK Patent Application GB 2314604A to Fukutome.

This reference is directed to piston ring for use in the interior of an internal combustion engine. As such, the color of the exterior of the rings is not an issue addressed by the reference. There is no metal bearing color layer upon which a transition layer is superimposed, as claimed in the present application.

Moreover, the exterior layers (24, 25) of the reference have a thickness of about 10 micrometers (100,000 angstroms). Page 7, 2d paragraph. As discussed above, 10 micrometers is too thick for that layer to be substantially transparent. Thus, there is no transition layer that is substantially transparent, as claimed in the present application.

The Fukutome reference does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on the Fukutome reference.

10. Claims 1, 2, 7, 8, 10-12, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by U.S. Pat. No. 5,426,000 to Labib.

The '000 patent is directed to coating individual fibers for use in fiber-reinforced metallic matrix composites, and, as such, color is not an issue. Color is not mentioned in the '000 patent. Thus, there is no metal bearing color layer, as claimed in the present application.

Also, there is no transition layer that is substantially transparent, as claimed in the present application. And the thickness of the coating identified in the only example is 6.3 micrometers (63,000 angstroms). The description indicates that the TiN layer between the two Ti layers is twice as thick as each Ti layer. Column 5, lines 12-14. So the thickness of the exterior Ti layer would be about 1.58 micrometers (15,800 angstroms). As discussed above, this is too great a thickness to be considered transparent. Thus, there is no transition layer that is substantially transparent, as claimed in the present application.

The '000 patent does not teach the coating claimed in the present application and Applicants respectfully request withdrawal of the rejection based on Labib et al. '000.

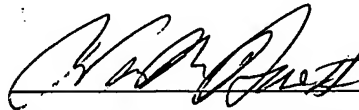
Appl. No. 10/055,301
Amdt. Dated January 9, 2004
Reply to Office action of August 12, 2003

As discussed above, the references cited in the Office Action do not disclose at least one of the elements present in the claims of the present application, as amended.

Applicant believes that the application is now in condition for allowance and respectfully requests notice to such fact be issued.

Respectfully submitted,

1/9/04
Date


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